Virginia Department of Transportation

We Keep Virginia Moving

Roadway Network System

HTRIS Current Business Processes

Version 0.3

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Information Technology Applications Division

Document History Page

Description	Contributor(s) and Comments	Date
Version 0.1- Draft prepared	Ken Twining	04/07/2004
Version 0.2 – Accident, Railroad, Traffic, and Speed Zone subsystems added.	Crissie Nicklow	04/09/2004
Version 0.3 – RDI and HPMS added. Screen shots added to Accident, Railroad, Traffic, and Speed Zone subsystems.	Crissie Nicklow, Mike Ryan, Tim Klinker	04/12/2004

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1. INTRODUCTION

This document represents the current business processes that revolve around the existing Highway Traffic Records Information System (HTRIS). The purpose of gathering current business processes is to ensure the Information Technology Applications Division (ITA) understands the needs of the various customers who use HTRIS. Process gathering is a critical step in the Requirements Definition process because it allows ITA the opportunity to identify potential areas for process improvement.

1.1 Background

The Roadway Network System Project (RNS) creates a replacement system for the aging HTRIS. The new system will incorporate a relational database that provides universal enterprise data access, links geo-spatial data and business attributes to the roadway centerlines, and provides web accessibility to users currently unable to retrieve critical roadway data.

The scope of work includes the migration of data from the ADABAS HTRIS system to the Oracle RNS, ensuring the roadway geo-spatial data is aligned with the roadway centerlines, connecting the business data to the geo-spatial roadway data, building a web-based system for retrieving the roadway and business data, and improving business processes that have been limited due to the older HTRIS technology.

1.2 Approach

The project team met with key representatives of each HTRIS subsystem. Emphasis during these meetings was on the current function/use and possible alternative approaches for managing the business needs. From this point, the project team developed flowcharts for each function discussed. This document represents the notes and flow chart diagrams based on the discussions with key HTRIS representatives.

The next steps will be to identify potential areas for process improvement, review them with the business representatives, and obtain approval from the Project Steering Committee. When process improvements are finalized, the project team will gather requirements specific to the reengineered workflow.

2. SUBSYSTEM INFORMATION

2.1 Roadway Inventory Subsystem

The Roadway Inventory Subsystem (RDI) contains the basic roadway attribute information inventoried on all state maintained routes. This subsystem provides the data maintenance functions for route identification, aliases, nodes and links. In effect, the RDI is the framework used by all other subsystems to locate events and features along individual routes. All official roadway characteristics and events are entered and maintained in the RDI Subsystem.

2.1.1 Process Flows

2.1.1.1 Secondary Road System Process

1. Developer asks VDOT for a Land Use Permit to tie into the existing state system. This action is initiated at the VDOT residency level by field inspectors and officially approved by the Permit Operations Program Manager of the VDOT Asset Management Division. Roadway information is then entered into the Land Use Permit System (LUPS).
2. After connectivity is approved, the developer or locality will request that that a section of road or roads is accepted into the state maintenance system. Inspectors at the VDOT residency level perform this approval after advising the developer or locality about requirements and or improvement costs.
3. Once the section of road or roads meets state requirements, the County Board of Supervisors guarantee right of way and take formal action to make it part of the state system. The VDOT Local Assistance Division oversees the legal acceptance process and enters roadway information into the Database for Administering Changes to the Secondary System. (DACSS). However, not all residencies use DACSS to report changes. These changes remain part of a 'hardcopy' roadway 'assembly package' that is later used by the Local Assistance Division, Regulations & System Changes section for data entry.
4. The fourth step is to load the data into the HTRIS RDI. The RDI represents the official record of the VDOT roadway network and forms the backbone of HTRIS. Some, but not all the basic functions and maintained by the RDI include:

    - Adding new roads
    - Extending existing roads
    - Adding links in a gap
    - Abandoning (discontinuances)
    - Entire route
    - Part of a route
    - Renumbering
    - Reconfiguring

    HTRIS depends on the Local Assistance Division to supply this information via manually generated "assembly package." DACSS is used for notification; however, DACSS and

HTRIS are not electronically compatible. Roads that do not meet entry criteria most be identified and driven by the Information Technology Applications (ITA) Division.

Documents and Forms:

- Maintenance Fees and Surety of Bonds (SR-4 form generated by DACCS)
- Rural Additions (SR-3 form generated by DACCS)
- Roadway Inventory (TE-SYSINV-1 form)
- Secondary Roads (SR-5 form)
- Copy of Plats, Sketches and maps showing locations and proper annotation for RDI attribution.

Format:

Paper reports and copies, some components are generated electronically from the Database for Administering Changes to the Secondary System. (DACSS).

Administrative Actions for Additions to the Secondary System:

Actions	Requirements
Board of Supervisors requests VDOT to make addition.	Certified copy of resolution required for all additions.
Resident Engineer coordinates processing of any agreements required between County and State through **Local Assistance Division** and prepares addition assembly for submission to the **Local Assistance Division**, consisting of the following:	Actions apply to all Additions
Certified copy of the BOS's resolution.	Required in all cases.
Completed Form SR-3	Required for Rural Additions, but not for subdivisions or school roads.
Completed Forms SR-4, SR-5 and TE-SYSINV-1	Required in all cases.
Surety and Maintenance Fees	As required for subdivisions only.
Supporting map and sketches of the additions	Required in all cases.
Payment of all voluntary or required participation	Required for Rural Additions, but not for subdivisions or school roads.
Secondary Roads Division • Reviews assembly & processes it for action by Commissioner. • *Forwards mapping information to Mobility Management Division.* • Advises BOS and VDOT staff of Commissioner's action. • Prepares resolution and monthly report for affirmation by CTB.	Actions apply to all Additions
CTB affirms Commissioners actions	Action apply to all Additions

IT Applications Data is loaded into Highway Traffic Records Information System (HTRIS).	Action apply to all Additions

2.1.1.2 Primary Road System Process

1. Commonwealth Transportation Board (CTB) accepts a new highway project. Project construction plans or realignment plans are developed in the Location Design Division and a copy of the plans are forwarded to the Mobility Management Division accompanied with the C-5 construction form used for reporting the starting and completion of all projects.
2. The Mobility Management Division Highway System section processes all projects involving primary and interstate highways. This section also creates sketches showing discontinuances, abandonment's and realignments that may also affect the secondary road system. All update information is then assembled into a hard copy packet 'assembly package' and forwarded to the ITA Division for inclusion into the HTRIS RDI.
3. The next step is to enter the hardcopy 'assembly package' data into HTRIS. To complete the 'assembly packages' all routes are driven by ITA to insure that mileages and intersections are accurate.

Documents and Forms:

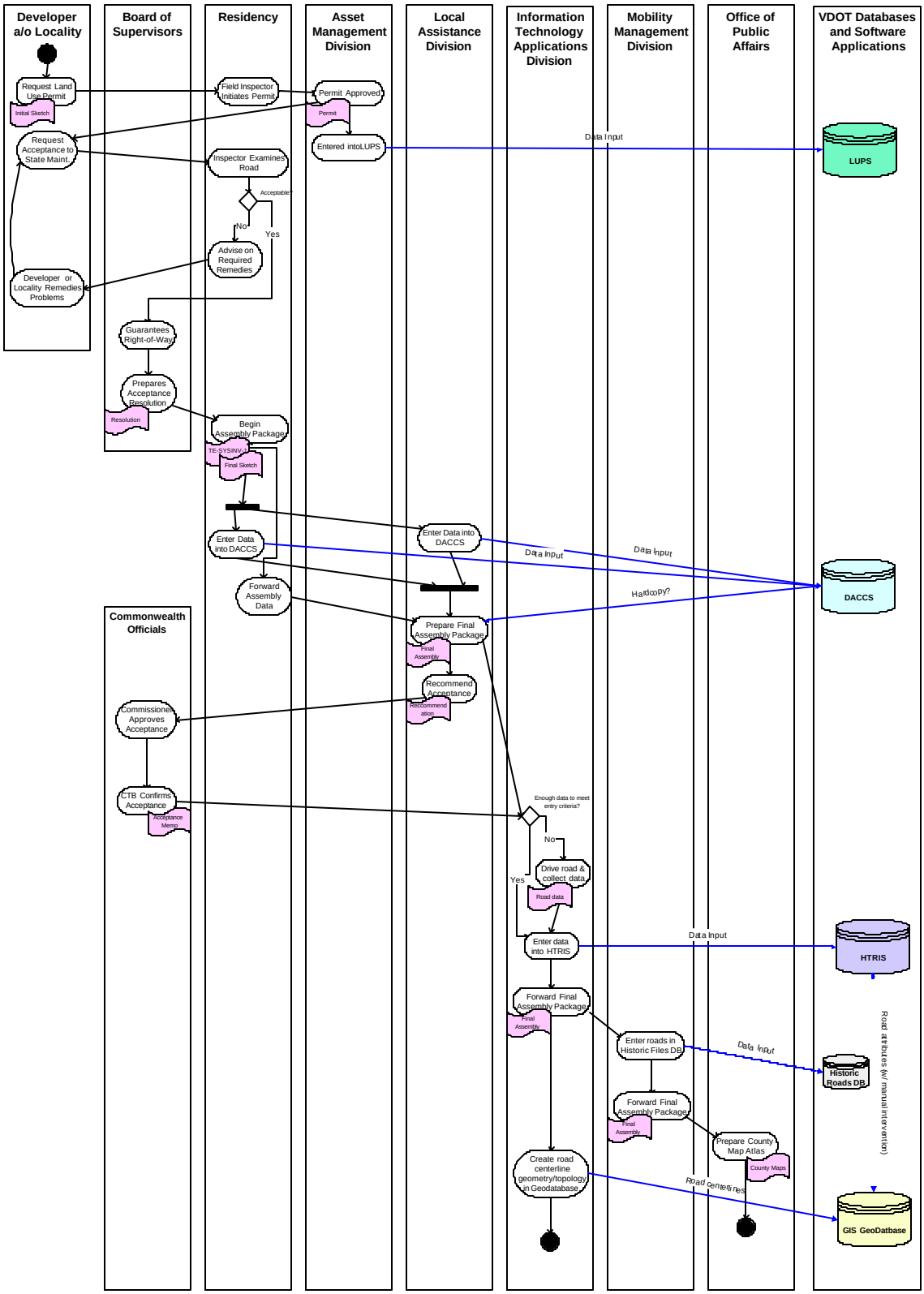
- C-5 construction forms
- Roadway Inventory (TE-SYSINV-1 form)
- Sketches showing discontinuances, abandonment's and realignments.

Format:

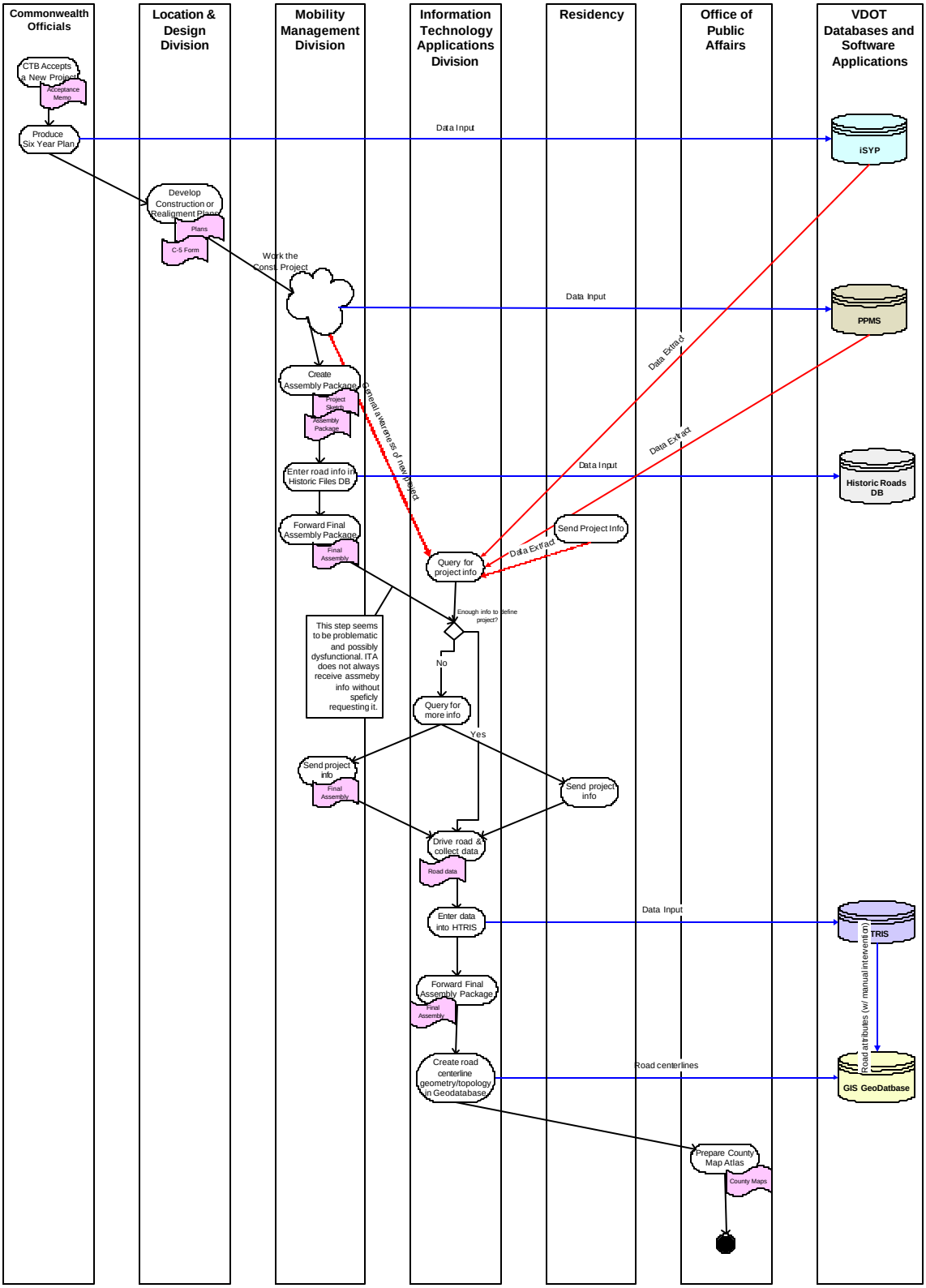
Paper Reports

2.1.2 Diagrams of Current Process

Secondary Roads Acceptance Process Activity Diagram



Acceptance Process for "VDOT Projects" Activity Diagram



2.1.3 Functions Not Used

All of the HTRIS Functions are currently being used.

2.1.4 Process Improvements

- Integrate centerline updates with Asset Management and Local Assistance Division's processes at the residency level.
- Coordinate data collection with current DACSS process.
- Eliminate dual, duplicate, and redundant data entry efforts.
- Create an invisible linkage to geospatial roadway network and associated business data through web services.
- Where appropriate, incorporate electronic approval process.

2.2 Central Subsystem

The HTRIS Central Subsystem (CEN) is maintained by the Central Subsystem Coordinator of Mobility Management. This subsystem performs the administrative functions in HTRIS and controls security access to HTRIS, table maintenance, batch reporting processes, and help text maintenance.

2.2.1 Process Flows

2.2.1.1 Security Process

Security settings are given to users through the Security interface, which uses the following workflow:

1. The HTRIS Division Information Coordinators completes and sends an ITD 35A to the Information Technology Operations (ITO) Division when a user requests new or a change in access to HTRIS.
2. If the user needs a highway number, ITO assigns a new highway number and sends the ITD35A to the Central Subsystem Coordinator. At this point, the user has read access or Level 1 security since the highway number was established.
3. If the user requests a change in security access, the subsystem coordinator signs the ITD35A and sends the ITD 35A to Cynthia Jones.
4. If the user does not request a change in security access, the subsystem coordinator sends the ITD35A to the Central Subsystem Coordinator.
5. Cynthia Jones goes to the User Table in HTRIS and adds the persons name, location, security level, subsystem, and printer number. ITO can supply the printer number.
6. The user now has an assigned security level.
7. You can have a HWY number without having to be in the HTRIS User Table. If you are not in the User Table, you default to Level 1 security for read only access. State Police have Level 1 security in HTRIS.
8. When a person no longer requires access to HTRIS, the Division Information Coordinator completes an ITD 35A and sends it to ITO.
9. ITO notifies Cynthia Jones and she removes the user from the HTRIS User Table. If the user still requires level 1 access, ITO takes no action. If the user's situation requires removal from HTRIS, ITO deletes the user's HWYID.

2.2.1.2 Table Maintenance Process

Users with higher permission settings can create tables in HTRIS, or ITA can create tables. In either case, the Table Maintenance interface is used to add items to the table and other general table maintenance functions.

The workflow is described as follows:

1. Cynthia Jones is notified by a user or HTRIS ITAD to create a new table in HTRIS.
2. Cynthia sets up new table definition in HTRIS. She then adds the appropriate table items.
3. Using the Table Maintenance Screen, Cynthia Jones can add, change, or delete table items.
4. Cynthia Jones can also delete an existing table using the Delete an Existing Table Definition Function.

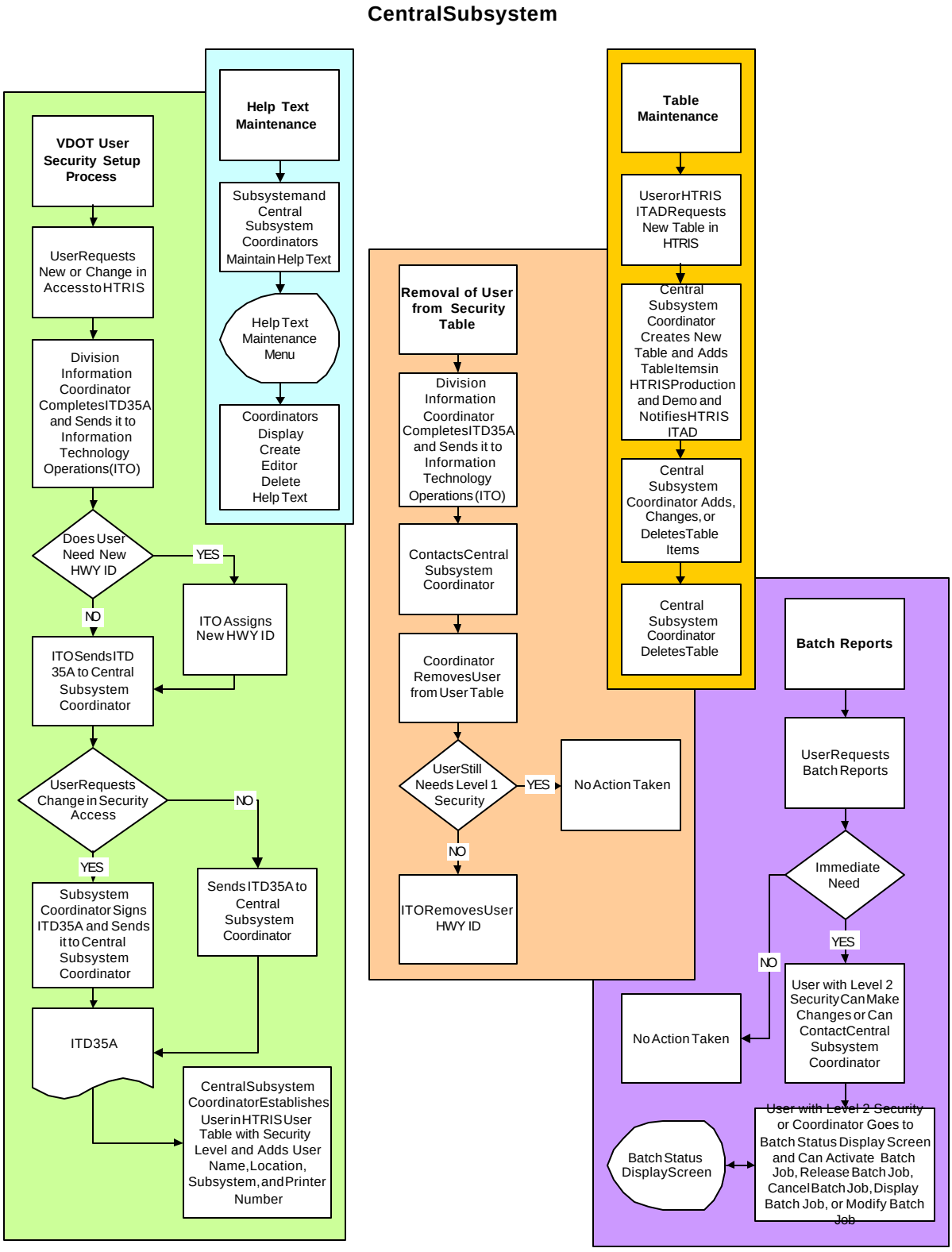
2.2.1.3 Help Text

1. HTRIS permits the subsystem and Central Subsystem Coordinators to display, add help text, change help text, or delete help text.
2. This help text is screen sensitive and would display to the users if they hit the PF1 key while they are on a screen.

2.2.1.4 Batch Reports

When an HTRIS User requests a batch report(s), it appears on the Batch Status Display Screen. Batch reports are run after 6 PM. If the user wants the print job immediately, they notify Cynthia. If the user has level 2 security, they can make the changes. Using the Batch Status Display Screen, Cynthia or users with level 2 security can Activate, Release, Cancel, Display, or Modify a requested batch job.

2.2.2 Diagrams of Current Process



2.2.3 Functions Not Used

All of the HTRIS Functions are currently being used.

2.2.4 Process Improvements

- Add ad hoc query and reporting capability.
- Transfer database maintenance to IT System Administrators.

2.3 Pavement Subsystem

The HTRIS Pavement Subsystem provides the capability to enter and maintain new road construction and maintenance-scheduled projects. This subsystem stores relevant information about road projects in HTRIS. This subsystem also creates the Wet Accidents reports using the accident data from the accident subsystem in HTRIS. The wet accident information is sent to the districts for analysis and a skid test is performed for sections that are not on the maintenance schedule. The skid data is then uploaded to the Pavement Subsystem where the information is available for inquiry and reporting.

2.3.1 Process Flows

2.3.1.1 New Construction Projects

1. When a new road or road section is built the information is entered into the Trns*port and CAS/CWB Systems. The CAS/CWB System is being replaced by the Site Manager System in July 2004.
2. When the construction project is completed, the inspector enters the information contained in the CAS/CWB System on the M-20 Form. This form is sent to the District Pavement Management Engineer where the data is entered into the HTRIS Pavement Subsystem.

2.3.1.2 Maintenance Schedule Projects

1. Maintenance Schedule Projects are input into the PMSS System. The PMSS system creates a Trns*port report. The information from the report is entered into the Trns*port System. The information is then passed to the CAS/CWB System.
2. When the construction project is completed, the inspector enters the information contained in the CAS/CWB System on the M-20 Form. This form is sent to the District Pavement Management Engineer where the data is entered into the HTRIS Pavement Subsystem.

2.3.1.3 Wet Accidents

1. The Materials Division produces a Wet Accident Hot Spot Report using the HTRIS Accident Subsystem Data. Materials separates the report by district. Materials then sends the Wet Accident Hot Spot Report to the District Materials, Maintenance, and Pavement Management Engineers.
2. If the Wet Accident Site that is on the hot spot report is on the maintenance schedule, the wet accident is not acted on.
3. If it is not on the maintenance schedule, The Non Destructive Testing Division performs a skid test at the site.

2.3.1.4 Skid Processing

1. The Non Destructive Testing (NDT) Section performs a skid test at the identified wet accident hot spot.
2. The skid data is collected by the NDT Friction Van.
3. The skid data from the NDT Friction Van is processed by the Materials Division.

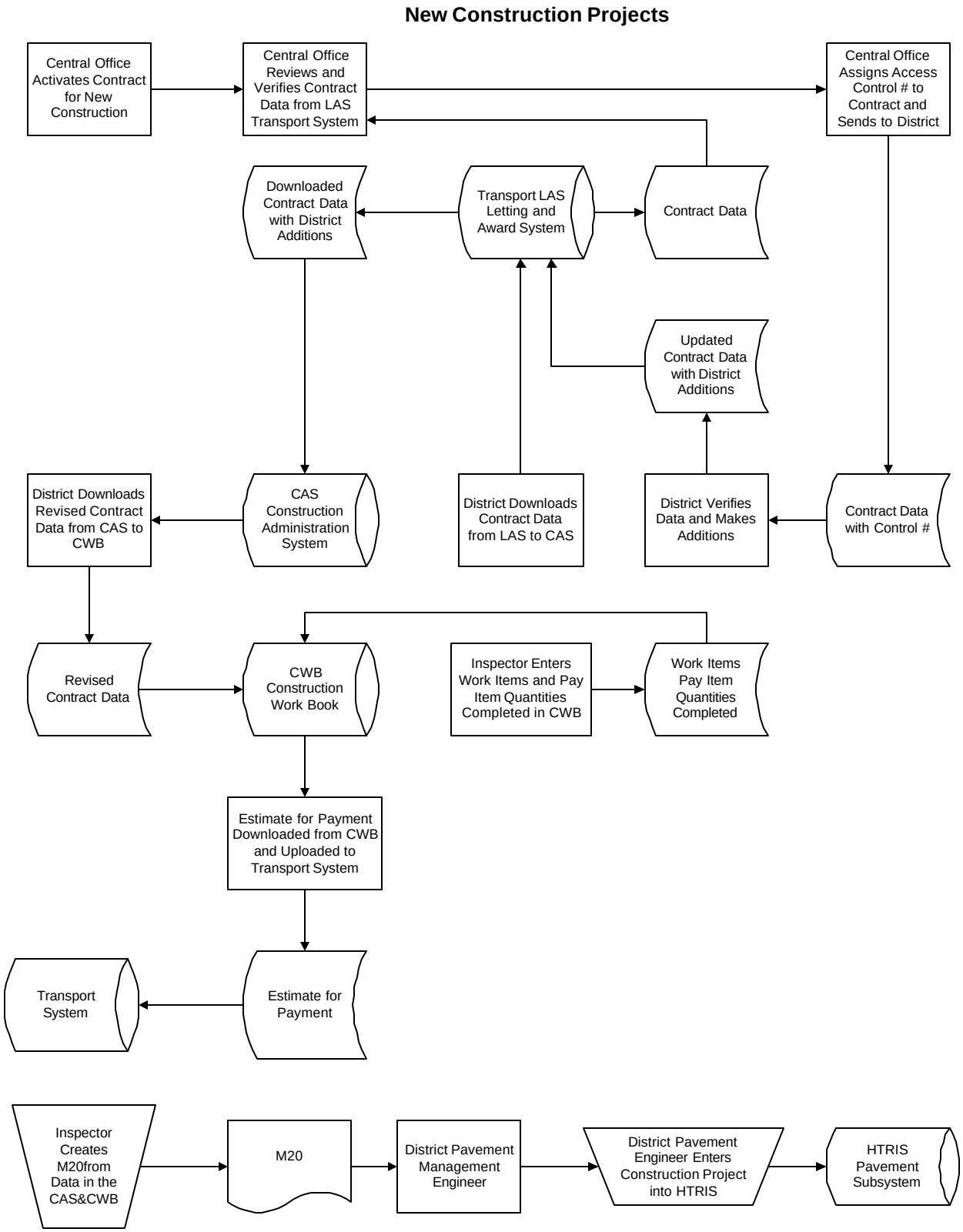
4. The skid data collected by the van is then uploaded to the HTRIS Pavement Subsystem.
5. The Materials Division then produces the Skid Potential Hotspots Report from the skid data in the Pavement Subsystem.
6. The Materials Division reviews the report. If the skid number is greater than 20, nothing is done. If the skid number is 20 or less, the Materials Division flags the section and sends the information to the District Maintenance Engineer.
7. The District Maintenance Engineer installs a sign "Slippery When Wet" at the site.
8. The District Maintenance Engineer corrects the problem at the hot spot site with slurry seal and puts the site on the maintenance schedule.

2.3.1.5 Batch Reports

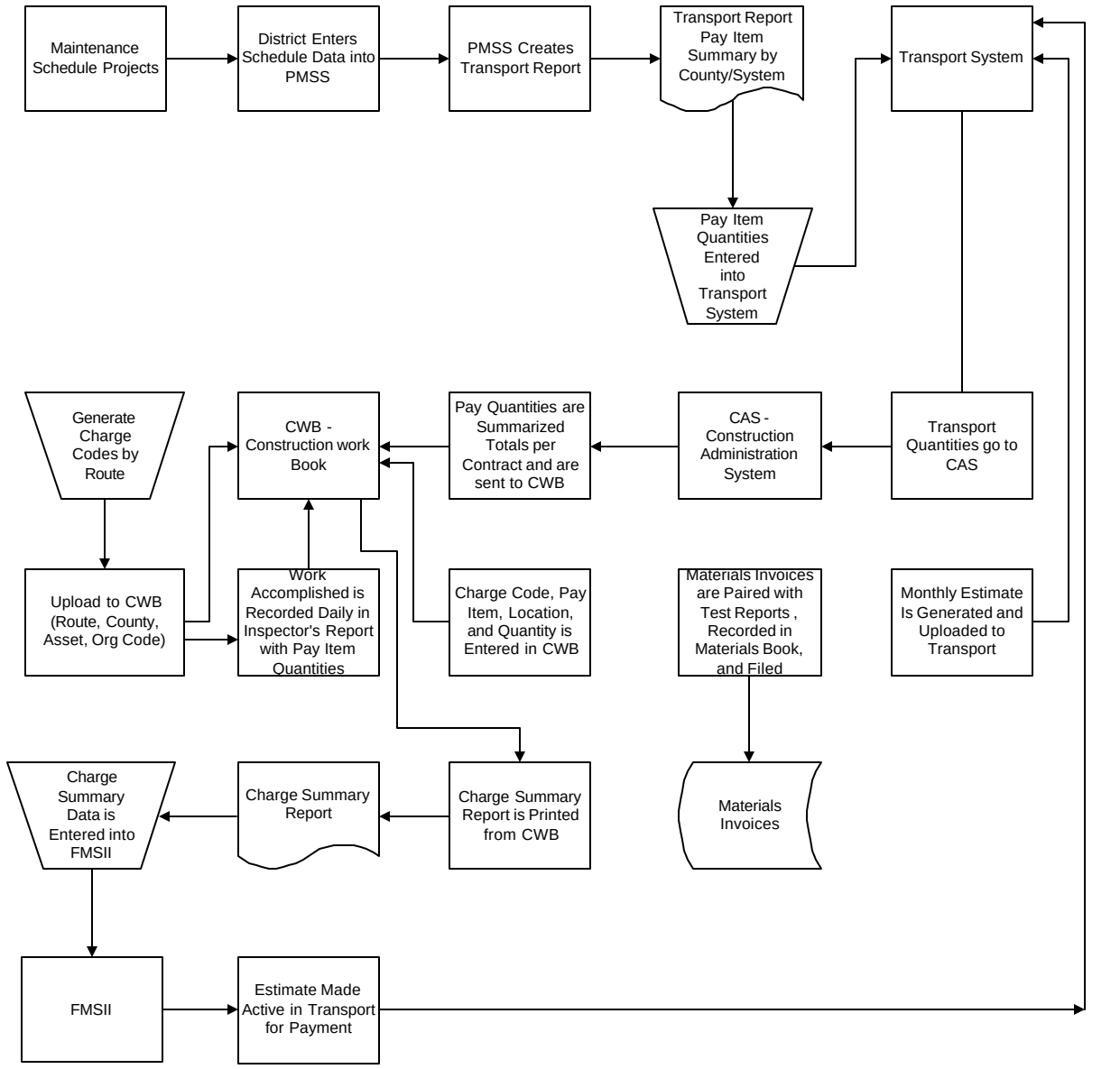
The HTRIS Pavement Subsystem creates the following batch reports:

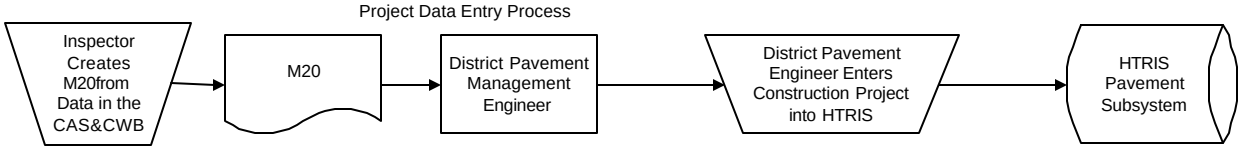
- Pavement Details by Node & Offset
- Master File Report
- Pavement Description Master
- Pavement Information System
- Maintenance Planning Summary
- Surface Mix Section Direction
- Resurface Lane Mileage Report
- Skid Tests Report
- Skid Tests Raw Data Report
- Wet Accident/PWAH Reports

2.3.2 Diagrams of Current Process

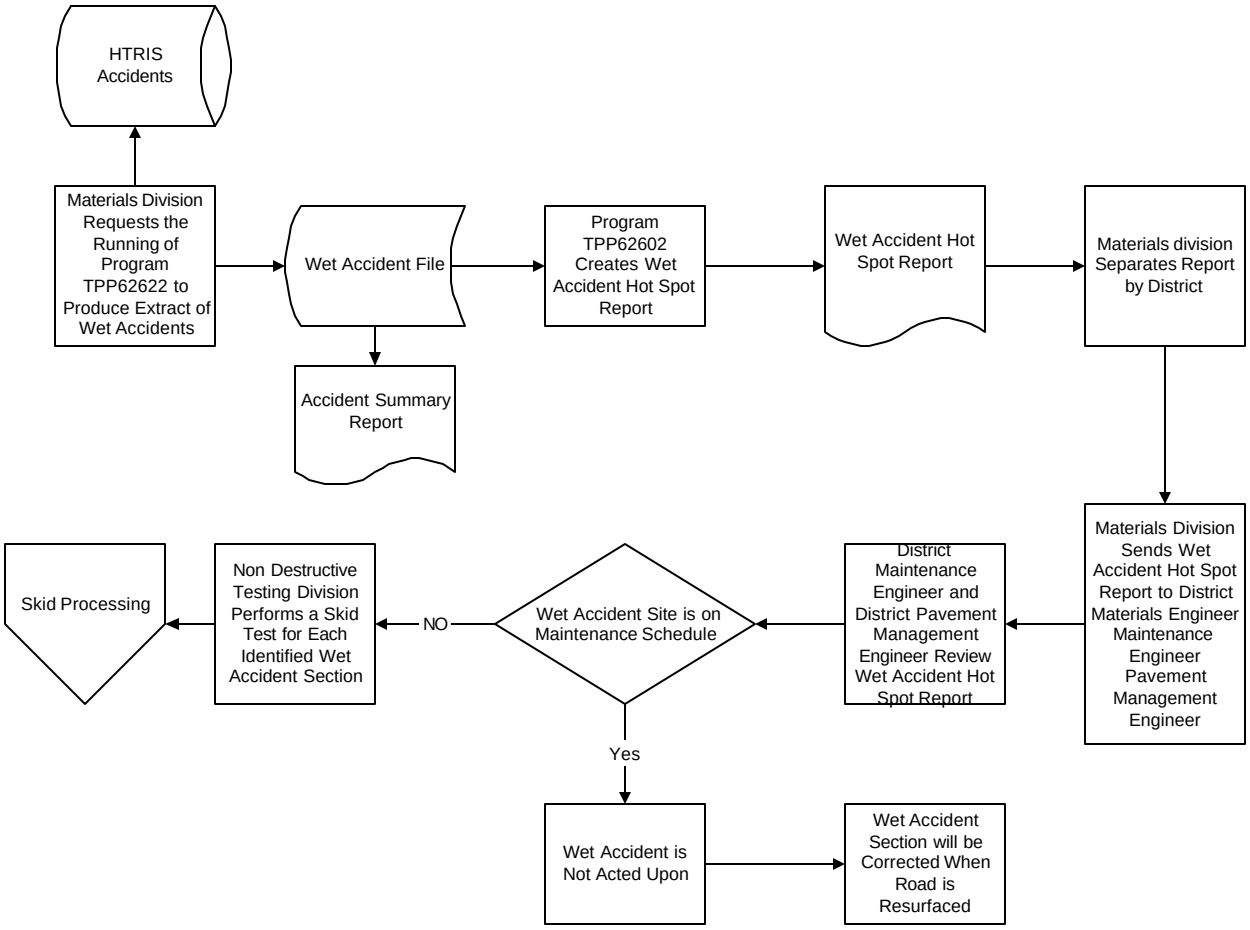


Maintenance Schedule Projects

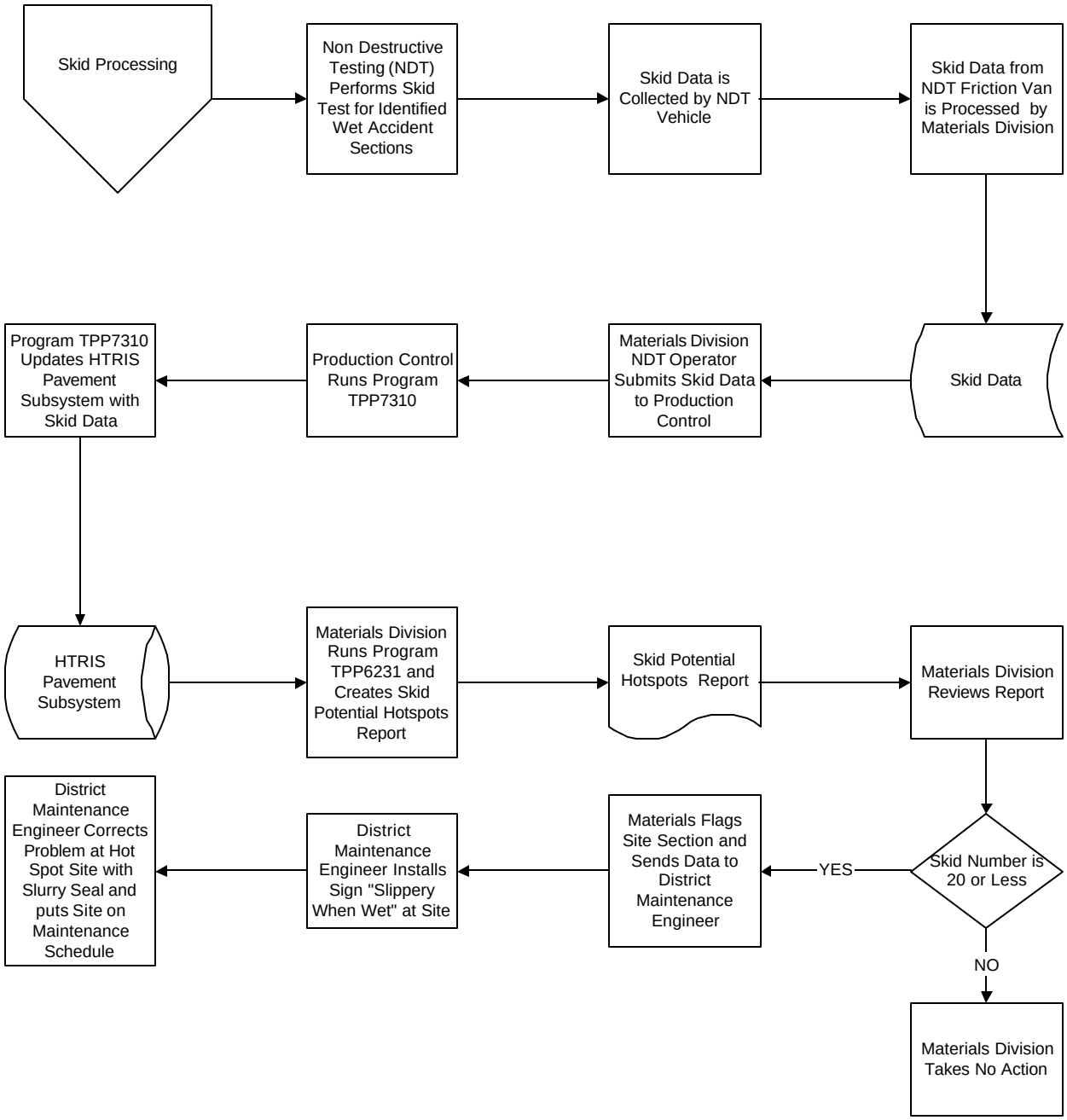




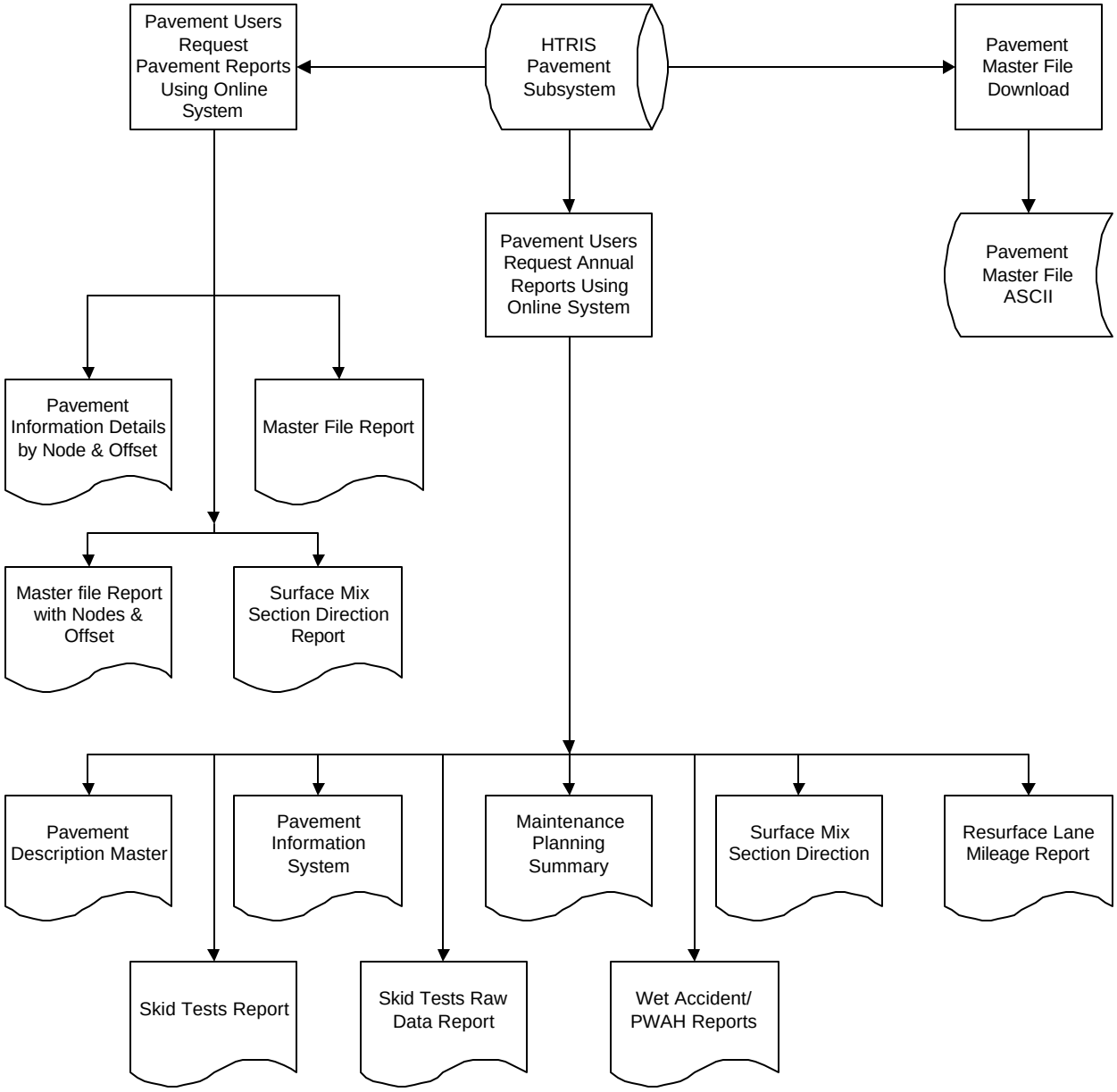
Wet Accidents



Skid Processing



Pavement Subsystem Batch Reports



2.3.3 Functions Not Used

- All Condition Menu Functions
- For the NDT Menu (Non-Destructive Testing) only the Skid Test Items are being used by the Materials Division.
- The Deflection Menu and Road Profile Menu Items are not used.
- The PRS Download is not used.
- Selected Reports - DMR, Deflection, and Road Profile.

2.3.4 Process Improvements

- Include the Skid and Wet Accident Functions in the RNS System and transfer the processing of road projects to the Asset Management System.
- Automate the M-20 Process by extracting the project data from the CAS/CWB System, creating an electronic project file, and updating HTRIS with the electronic M-20 data.
- Create an electronic wet accident file that can be sorted and distributed by district. This process will eliminate the manual sorting and distribution of the Wet Accident Report.
- Create an electronic version of the Skid Potential Hot Spots Report that would differentiate the skid numbers that are 20 or less and distribute the data to the districts electronically. This process would eliminate the manual review of the report by the Materials Division.

2.4 Structure Subsystem

The HTRIS Structure Subsystem maintains the structure inventory for approximately 11,700 bridges and 7,300 culverts, including pipes plus under records (20,000 records on & under) in the state. This inventory comprises both federal and state-specific data. The federal data comprises the requirements of the NBI and is reported annually in April to the Federal Highway Administration (FHWA) headquarters in Washington, D.C. The state-specific data is intended for use by the agency and supplements the federal data. There are 116 federally reportable data items and 186 state data items in the Structure Subsystem. The Structure Subsystem has the capability to add, replace, or delete structures. Structure inspections are entered in the Pontis System and uploaded to the HTRIS Structure Subsystem. The Structure Subsystem interacts with data entry in Trns*port and CAS/CWB, batch downloads of STI data going to FMS and batch downloads of STI data from PPMS and PPMS capability to read STI data, and one way upload to the Pontis System.

2.4.1 Process Flows

2.4.1.1 Bridge Projects

1. Bridge construction and maintenance are funded with construction funds or maintenance contract funds. Bridge maintenance can also be funded with maintenance contract or state forces funds.
2. The FMS System generates a UPC # and sends it to the PPMS System. Charges to a Structure project are entered into FMS for all funding types. The FMS System downloads the structure id, RDI from the HTRIS Structure Subsystem nightly. The Route-Sin in STI is used to link county and route # from RDI.
3. A UPC # is entered into the Trns*port system for all Structure funding types.

4a. When bridges use construction funds, the structure id is associated with the project number (aka UPC#) and is entered in the Trns*port System.

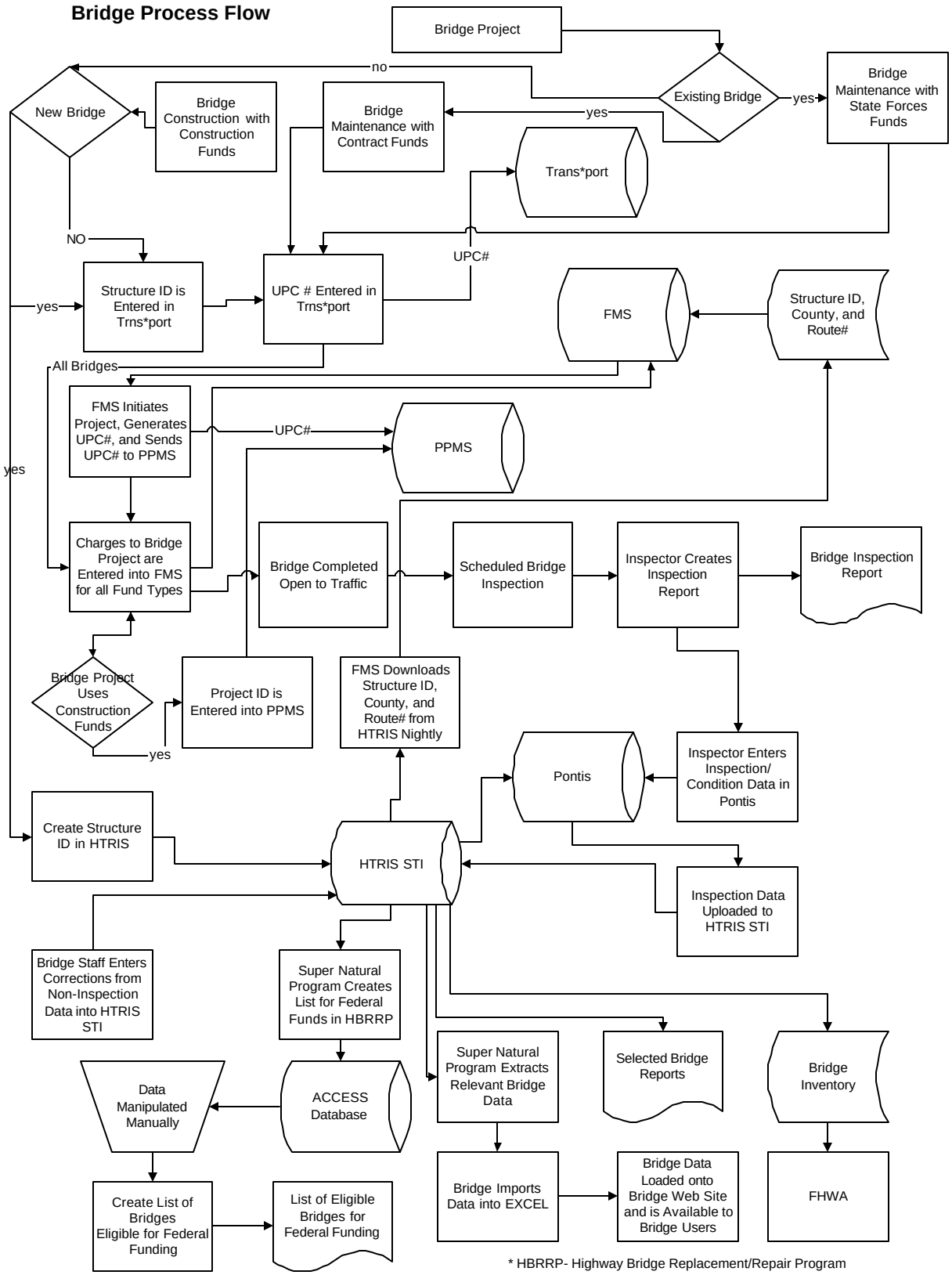
4b. If it is a new Structure, a new structure id is created in the HTRIS Structure Subsystem.
5. If the bridge project uses construction funds, the project id is entered into the PPMS System.
6. The bridge is complete when it is open to traffic. The year final payment is made to the contractor is in HTRIS.
7. PPMS analyzes structure inventory to determine if bridge is eligible for federal funds for replacement or rehabilitation.
8. Run NAT Query in HTRIS to identify if bridge is eligible for federal funds. Data is processed by ACCESS Database.
9. The data from the ACCESS Database is manually manipulated to see if anything changes for bridge eligibility for federal funds.
10. A batch list of bridges eligible for Federal funding is created.
11. Major Structure enhancements: After the bridge is finished, it is re-inspected and reevaluated. The work completed is evaluated and the bridge condition rating is most often raised in the structure inventory.
12. After the Structure is inspected, its condition is likely to change, and mistakes in HTRIS STI are discovered; like erroneous material type. These mistakes are then corrected in the HTRIS STI.
13. The Latitude and Longitude are maintained in HTRIS STI and reported to the Federal Government. Approximately 95% of the changes that are entered into the HTRIS STI are initiated from the inspection report.
14. Structures are inspected on a schedule, and when the inspection is complete, the inspection data is then entered into Pontis. Pontis develops ratings for the deck, superstructure, etc., and uploads the rating to HTRIS STI. The inspector the creates an inspection report.
15. HTRIS (STI) is updated weekly from Pontis. The on-line is updated daily.
16. A S&B web site has been created for the bridge users. The base information is pulled out of HTRIS, the numeric codes are changed to text, and the data is then put on the S&B Web Site. The Web Site has the information in an EXCEL Spreadsheet. This information is updated quarterly.
17. The Bridge staff is using Super Natural Version 4 for downloading HTRIS (STI) data. Bridge is trying to build a query system for all districts. Approximately half of the districts have created systems to produce their bridge reports.
18. VDOT provides Structure inventory from HTRIS STI to the Federal Government (FHWA) on April 1 annually.

2.4.1.2 Bridge Inspections

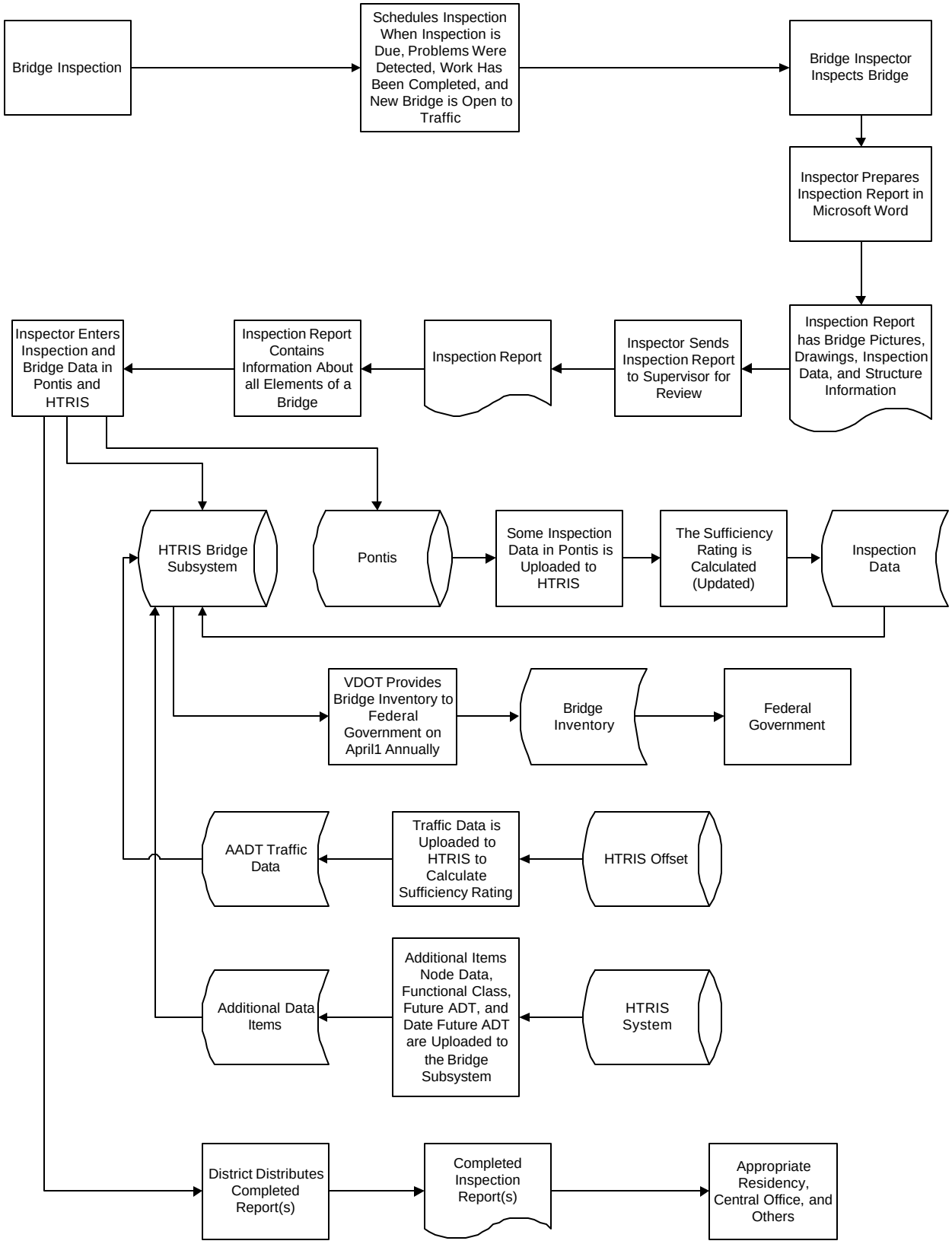
1. The Federal Government sets NBI Inspection Requirements.
2. There are approximately 20,000 structure records on and under in Virginia.
3. Bridges are inspected when inspection is due, problems are detected, work has been completed, and a new Structure is open to traffic.
4. Inspector prepares inspection report in Microsoft Word. Inspector sends inspection report to supervisor for review. The inspection report contains information about all elements of a bridge. The inspection report is distributed to the appropriate residency and central office staffs.

5. Inspector enters inspection and bridge data in Pontis and HTRIS STI. Some inspection data in Pontis is uploaded to HTRIS STI. The Sufficiency Rating is (updated) in HTRIS STI.
6. Traffic data (AADT) is uploaded annually with the push from TMS to HTRIS STI to calculate Sufficiency Rating. Additional items, such functional class, future ADT, and date future ADT are uploaded to HTRIS STI from other HTRIS Subsystems.
7. There are two structure Ids in HTRIS. The state id (3 position county and 4 position Structure#) and federal id (5 position #). State id - 0181917, Fed id - 04801. This number is actually 15 digits with the 513 prefix.
8. The inspection report is a word document with pictures and drawings of the bridge. It also contains the inspection data, structure information about the bridge, and Pontis Report.
9. Some inspection related changes are only entered into Pontis such as the inspection data. If the width of the bridge changes, these changes must also be entered into HTRIS STI. Also, field posting for weight restrictions.

2.4.2 Diagrams of Current Process



Bridge Inspection Process



2.4.3 Functions Not Used

All the Structure functions in HTRIS are being used.

2.4.4 Process Improvements

- Eliminate the dual entry of data in the Structure STI System and Pontis – possible choices:
  - Locate business data in a subsystem of RNS
  - Locate structure business data in AMS
  - Locate structure business data in the AASHTO BRIDGEWare product
- Eliminate the uploading of data from Pontis to the Structure STI System. The RNS System will be able to access multiple databases, which will eliminate the necessity of moving data from other systems into the HTRIS Replacement System.
- Eliminate the uploading of data, such as traffic, from the HTRIS Traffic subsystem to the Structure STI.
- Eliminate the need to create district Structure systems. The RNS System will have flexible reporting and inquiry capabilities that should provide the flexibility for the district staffs to report and retrieve any Structure data from multiple systems.

2.5 Traffic Count Analysis Subsystem

The Traffic Count Analysis Subsystem (TCA) was intended to perform analysis on traffic data collected by traffic count devices placed in roadway sections throughout the state. However, Mobility Management's Traffic Monitoring System (TMS) is currently performing the analysis and calculations. TMS relies on the roadway inventory data (RDI) from HTRIS, which it loads annually or as needed. Since other HTRIS subsystems rely on the summary traffic data housed in TCA, that data from TMS is loaded into TCA.

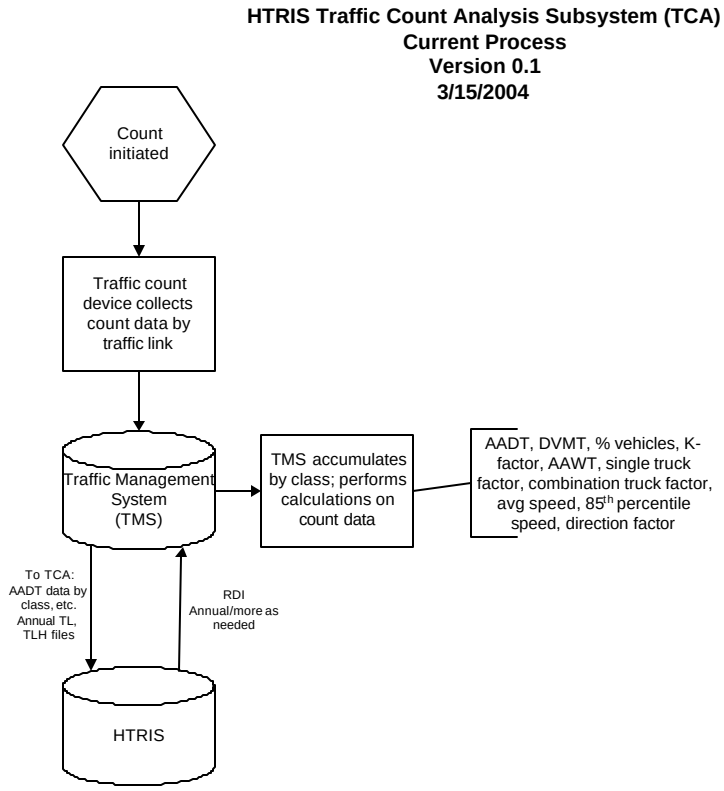
2.5.1 Process Flow

The following flow represents how data is collected from the original source, the traffic count devices. Note that TMS is performing all the calculations and TCA is merely a "data repository."

1. Traffic count devices collect count data by link and feed it to TMS.
2. TMS accumulates the count data by class and calculates AADT, DVMT, percent vehicles, K-factor, AAWT, single truck factor, combination truck factor, average speed, 85^{th} percentile speed, direction factor, etc.
3. *In addition to TMS's own reporting*, TMS sends summary data to TCA.

Annually (or more often as needed):
TMS loads data from RDI.

2.5.2 Diagram of Current Process



2.5.3 Functions Not Used

Data entry and calculation functions of TCA are not used, as they have been replaced by TMS.

2.5.4 Process Improvements

All of the traffic data processing occurs outside of HTRIS. No action is recommended to improve the process except to create a direct link to TMS so annual downloads/uploads are not necessary; rather, give the users real-time data access.

2.6 Accident Subsystem

When accidents occur, VDOT is responsible for updating the DMV's CAP System with the location of the accident and information about roadway condition (ex. debris in the roadway, water, etc.). The Accident Subsystem (ACC) provides VDOT a means to enter accident data into CAPS and load other CAPS data for reporting and for the use of other systems and HTRIS subsystems.

2.6.1 Process Flow

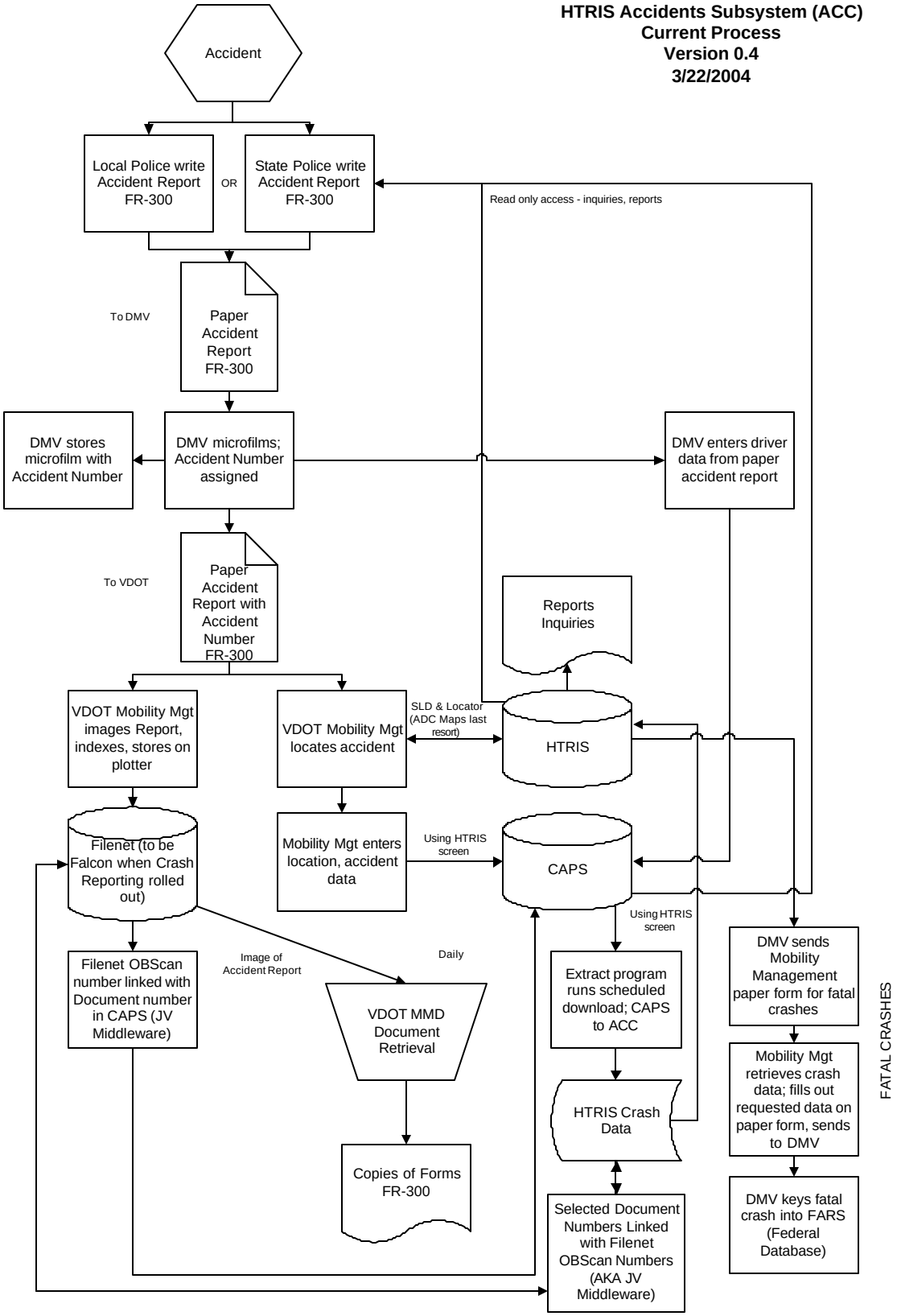
1. When a crash occurs, State or Local police complete an FR-300 Accident Report and send it to DMV.

2. DMV microfilms the FR-300, where an Accident Number is stamped on it. This Accident Number becomes the official record ID number. DMV stores the microfilm with the Accident Number.
3. DMV enters driver data from the FR-300 into CAPS and sends the paper FR-300 to VDOT Mobility Management.
4. Mobility Management images the FR-300, indexes it and stores it in Filenet. The Filenet OBScan number is linked with the Accident Number in CAPS through a middleware product.
5. At the same time, Mobility Management also goes into ACC and locates the accident (using the Straight Line Diagram and/or Locator). If they cannot locate the accident in HTRIS, they use ADC maps and scale the location in.
6. Using an HTRIS screen, Mobility Management enters the location and road condition data into CAPS.
7. An extract program runs a scheduled load of CAPS data to ACC for reporting and inquiries.

For fatal crashes (in addition to process above):

1. DMV sends Mobility Management a paper form for fatal crashes, completed with driver information.
2. Mobility Management retrieves the crash data and completes the form with roadway information; sends it back to DMV.
3. DMV keys the data into the Fatal Accident Reporting System (FARS).

2.6.2 Diagram of Current Process



2.6.3 Functions Not Used

All functions in the ACC are currently being used.

2.6.4 Process Improvements

All current functionality must be brought over to the RNS. However, a possible process improvement would be to revamp the document scanning processes of DMV and VDOT to ensure there is no redundant effort.

2.7 Speed Zone Subsystem

The Speed Zone Subsystem (SPZ) is no longer being used. Mobility Management developed a Speed Zone Database that exists outside of HTRIS and is kept up to date by the Districts. The Speed Zone Database is not only an inventory of speed zones, but it is also a history file on resolutions approving speed zones.

2.7.1 Process Flow

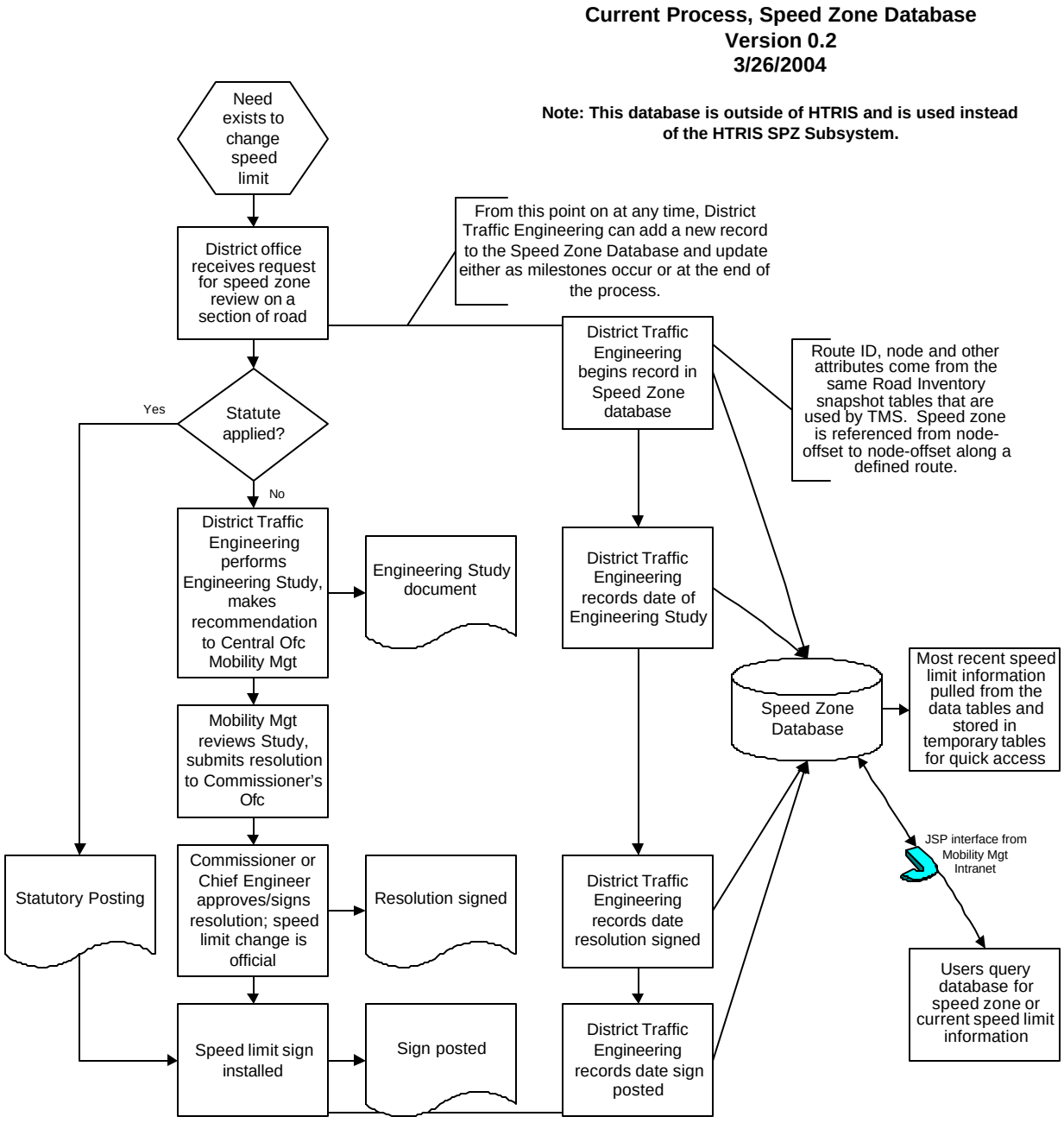
Although SPZ itself is no longer being used, there is a process for satisfying the function that SPZ was meant to provide. The following flow illustrates the process for updating the Speed Zone Database. Official HTRIS Route ID, node, and other attributes comes from the same RDI snapshot tables that are used by TMS. Speed zones are referenced from node-offset to node-offset along a defined route.

1. A District office receives a request for speed zone review on a section of road.
2. If a statute is applied, skip to Step 6.
3. District Traffic Engineering performs an Engineering Study and makes a recommendation to Central Office Mobility Management.
4. Mobility Management reviews the Engineering Study and, if in agreement, submits a resolution to the Commissioner's Office.
5. If in agreement, the Commissioner or Chief Engineer signs the resolution, marking the official change of the speed limit.
6. The District posts a new speed limit sign.

From the time the District receives the request (Step 1) or at any time after, the District can add a new record to the Speed Zone Database. They can update the record as the deliverables occur (Step 3: Engineering Study, Step 5: Resolution signed; Step 6: Sign posted) OR all in one sitting at the end of the process.

Anyone in VDOT can query the Speed Zone Database for current speed limit information through a JSP interface on the Mobility Management Intranet site.

2.7.2 Diagram of Current Process



2.7.3 Functions Not Used

None of SPZ is used.

2.7.4 Process Improvements

We recommend that the Speed Zone Database be incorporated as part of HTRIS and the speed zone linked to the RDI, making speed limit an attribute of the roadway. Another alternative would be to link the existing Speed Zone Database with the RNS for roadway inventory.

2.8 Railroad Crossing Subsystem

The Railroad Crossing Subsystem (RRX) keeps an inventory of all railroad crossings throughout the state. However, many of the functions in RRX have been replaced by an Access database known as RR_Main. This is because RRX is not flexible enough to meet some of the demands of federal reporting (Federal Railroad Administration, or FRA).

2.8.1 Process Flows

Annually, RR_Main downloads Route ID, node, and offset data from RDI, as well as AADT data from TCA. Semiannually (January and July), RR_Main uploads inventory changes to RRX. Therefore, there could be a discrepancy between the inventory data in RRX and RR_Main at any given time. Annually, RR_Main uploads the entire crossing inventory to the FRA database.

2.8.1.1 Entering a New Crossing

1. Upon learning that a railroad crossing needs to be entered, Mobility Management assesses/inventories it and takes a digital photo (stored on server).
2. Mobility Management opens the crossing in RRX and enters the crossing data.
3. Mobility Management enters the new crossing into RR_Main. Some data elements are the same as the RRX record, some different.

2.8.1.2 Updating an Existing Crossing

If there is an crash at the railroad crossing, skip to Step 2.

1. Mobility Management assesses/inventories it and takes a digital photo (stored on server).
2. Mobility Management updates the crossing record in RR_Main. *No RRX data entry occurs for this function.*

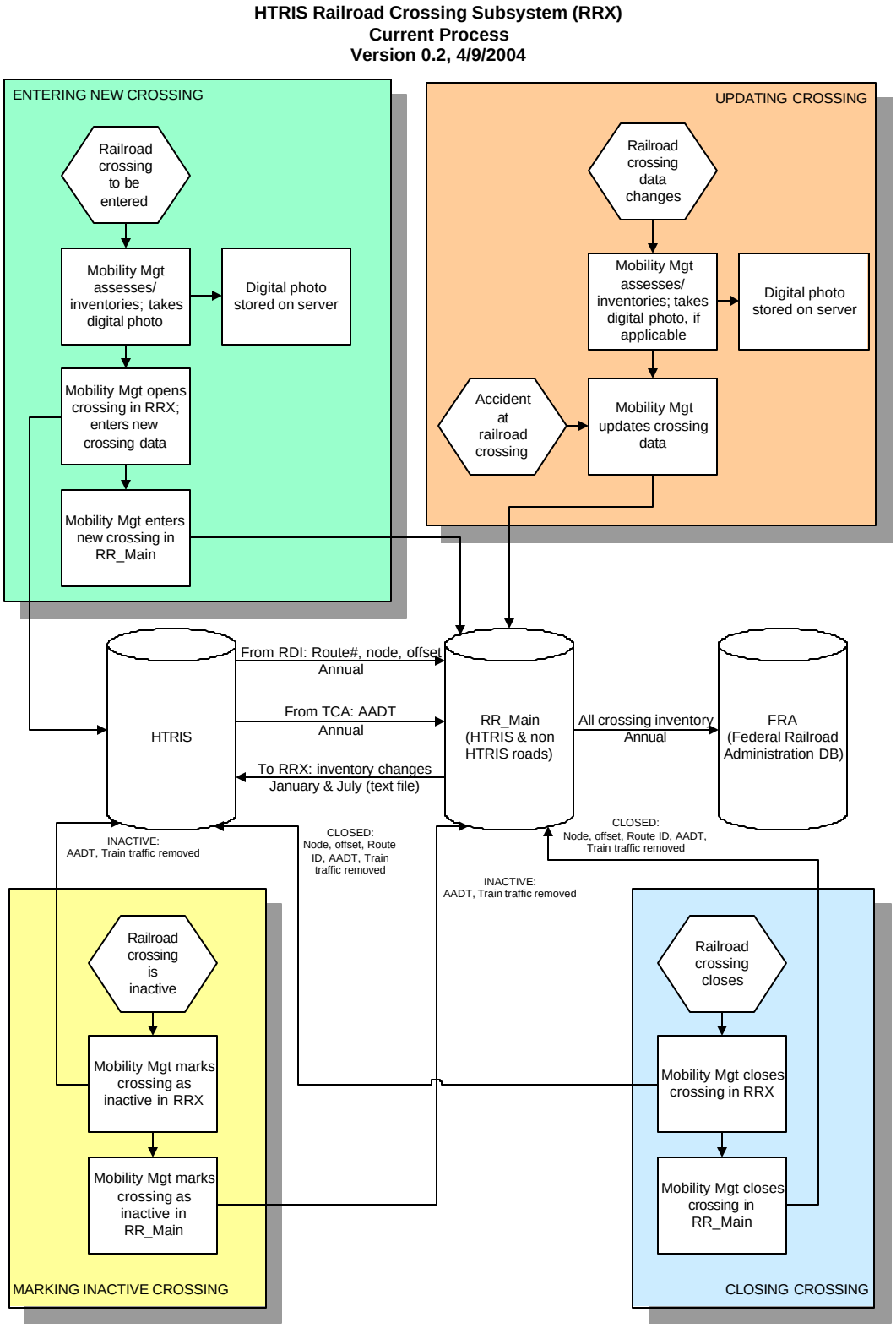
2.8.1.3 Marking a Crossing as Inactive

1. Upon learning that a railroad crossing is inactive, Mobility Management enters the data necessary to mark the crossing as inactive in RRX. AADT and train traffic data are removed from RRX.
2. Mobility Management enters the data necessary to mark the crossing as inactive in RR_Main. AADT and train traffic data are removed from RR_Main. Some data elements are the same as the RRX record, some different.

2.8.1.4 Closing a Crossing

1. Upon learning that a railroad crossing is closed, Mobility Management enters the data necessary to mark the crossing as closed in RRX. Node, offset, Route ID, AADT, and train traffic data are removed from RRX.
2. Mobility Management enters the data necessary to mark the crossing as closed in RR_Main. Node, offset, Route ID, AADT, and train traffic data are removed from RR_Main. Some data elements are the same as the RRX record, some different.

2.8.2 Diagram of Current Process



2.8.3 Functions Not Used

HTRIS reporting functions are not being used, because RR_Main has its own reporting capabilities that more accurately align with FRA requirements.

2.8.4 Process Improvements

Incorporate the functionality of the RR_Main database so RRX is the sole source of data for railroad crossing inventory; preventing data entry (some of it redundant) from having to occur in two systems and keeping data current. Give the new RRX options for more flexibility to meet FRA reporting requirements. Also, provide a means to store and retrieve the digital photo taken of the crossing, so that it is connected with the record.

2.9 Traffic Controls Inventory Subsystem

The Traffic Controls Inventory (TCI) was originally intended as a means to inventory all the traffic control devices (signs, markings, etc.) on a section of roadway. This information is meant to be kept current by the Districts. The Districts, however, use their own inventory media (Access databases, Excel spreadsheets, etc.) and keep their own inventory outside of TCI. In other words, TCI is not being used.

The Asset Management Division has obtained all the traffic controls inventory from the Districts and has provided it for the Asset Management Program to add to its inventory. Therefore, there will be no need to replicate the functionality of TCI in the Roadway Network System.

2.10 Highway Performance Monitoring Subsystem

The Highway Performance Monitoring Subsystem (HPM) produces annual highway performance reporting required by the Federal Highway Administration (FHWA) as part of the Highway Performance Monitoring System (HPMS). At the national level, HPMS includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways. In general, the HPM contains administrative and system information on all public roads, while information on other characteristics is represented as a mix of universe and sample data for arterial and collector functional systems.

The major purpose of the HPM is to support a data-driven decision process within the FHWA, the Department of Transportation (DOT), and Congress. The HPMS data are used extensively in the analysis of highway system condition, performance, and investment needs that make up the biennial Condition and Performance Reports to Congress. These Reports are used by the Congress in establishing both authorization and appropriation legislation, activities that ultimately determine the scope and size of the Federal-aid Highway Program, and determine the level of Federal highway taxation.

2.10.1 Process Flows

2.10.1.1 Extract HPMS Sample Data

1. Drive targeted sample roadways and record characteristics in “Inspect” software package.

2. Create inspection report and key in sample data from "Inspect" into HPMS subsystem (1900 samples are keyed in).

2.10.1.2 Build Federal File

1. Freeze RDI Configuration
2. Coordinate with other HTRIS subsystems (see diagram).
3. Make copy of HTRIS data.
4. Insert road sample characteristics data and import accident from ACC subsystem
5. Build federal reporting files and import federal program. Reconcile mileage differences and un-freeze HTRIS database.
6. Create federal report detailing needs assessment of sample data reported to FHWA for use in determining federal aid.

Detailed Process Steps:

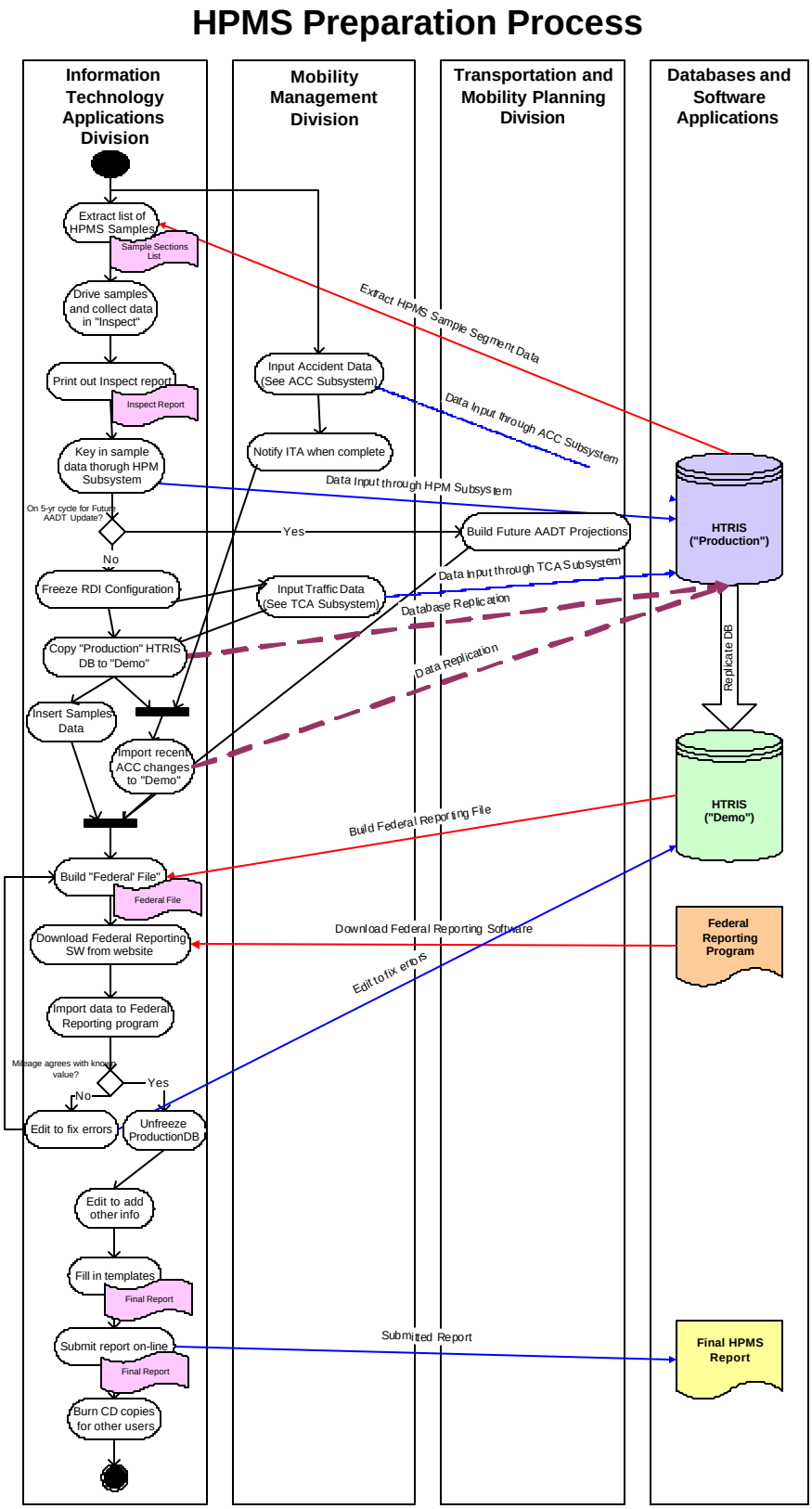
No.	Data Item	Update Cycle
1	Year of Data	Assigned by Conversion program
2	State Code	Assigned by Conversion program
3	Reporting Units – Metric or English	Assigned by Conversion program
4	County Code	Federal code converted from RDI by Conversion Program
5	Section Identification	Assigned by Conversion program
6	Is Standard Sample	Assigned by Conversion program
7	Is Donut Sample	Assigned by Conversion program
8	State Control Field	Assigned by Conversion program
9	Is Section Grouped?	Assigned by Conversion program
10	LRS Identification	Assigned by Conversion program
11	LRS Beginning Point	Assigned by Conversion program
12	LRS Ending Point	Assigned by Conversion program
13	Rural/Urban Designation	HTRIS-RDI
14	Urbanized Area Sampling Technique	Conversion program
15	Urbanized Area Code	HTRIS-RDI
16	NAAQS Non attainment Area Code	Conversion program
17	Functional System Code	Federal code converted from RDI by Conversion Program
18	Generated Functional System Code	Software calculated
19	National Highway System (NHS)	HTRIS-RDI
20	Planned Un-built Facility	HTRIS-RDI

21	Official Interstate Route Number	Assigned by Conversion program
22	Route Signing	HTRIS-RDI
23	Route Signing Qualifier	HTRIS-RDI
24	Signed Route Number	Assigned by Conversion program
25	Governmental Ownership	HTRIS-RDI
26	Special Systems	HTRIS-RDI
27	Type of Facility	HTRIS-RDI
28	Designated Truck Route	HTRIS-RDI
29	Toll	HTRIS-RDI
30	Section Length	HTRIS-RDI
31	Donut Area Sample AADT Volume Group Identifier	Software calculated from updated AADT; if AADT not reported, change as necessary
32	Standard Sample AADT Volume Group Identifier	Software calculated from updated AADT; if AADT not reported, change as necessary
33	AADT	MMD-TMS
34	Number of Through Lanes	ITAD-FC
35	Measured Pavement Roughness (IRI)	Materials Division
36	Present Serviceability Rating (PSR)	ITAD-FC and/or District Personnel
37	High Occupancy Vehicle (HOV) Operations	ITAD-FC
38-46	Highway Surveillance Systems	MMD-ITS
47	Sample Identifier	ITAD - HPMS Cord.
48	Donut Area Sample Expansion Factor	Software calculated
49	Standard Sample Expansion Factor	Software calculated
50	Surface/Pavement Type	Federal code converted from RDI by Conversion Program
51	SN or D	ITAD-FC
52	General Climate Zone	Software coded; change if necessary
53	Year of Surface Improvement	ITAD-RDI Staff
54	Lane Width	ITAD-FC
55	Access Control	HTRIS-RDI
56	Median Type	HTRIS-RDI
57	Median Width	HTRIS-RDI
58	Shoulder Type	ITAD-FC

59	Shoulder Width – Right	HTRIS-RDI
60	Shoulder Width – Left	HTRIS-RDI
61	Peak Parking	ITAD-FC
62	Widening Feasibility	ITAD-FC
63-68	Curves by Class	ITAD-FC
69	Horizontal Alignment Adequacy	Software coded when curve data reported; if curve data not reported, change when section improved
70	Type of Terrain	ITAD-FC
71	Vertical Alignment Adequacy	Software coded when grade data reported; if grade data not reported, change when section improved
72-77	Grades by Class	ITAD-FC
78	Percent Passing Sight Distance	ITAD-FC
79	Weighted Design Speed	Software calculated
80	Speed Limit	ITAD-FC
81	Percent Peak Single Unit Trucks	MMD-TMS
82	Percent Average Daily Single Unit Trucks	MMD-TMS
83	Percent Peak Combination Trucks	MMD-TMS
84	Percent Average Daily Combination Trucks	MMD-TMS
85	K-Factor	MMD-TMS
86	Directional Factor	MMD-TMS
87	Number of Peak Lanes	ITAD-FC
88	Left Turning Lanes/Bays	ITAD-FC
89	Right Turning Lanes/Bays	ITAD-FC
90	Prevailing Type of Signalization	ITAD-FC
91	Typical Peak Percent Green Time	ITAD-FC
92	Number At-Grade Intersections -- Signals	ITAD-FC
93	Number At-Grade Intersections -- Stop Signs	ITAD-FC
94	Number At-Grade Intersections -- Other or No Controls	ITAD-FC

95	**Peak Capacity**	**Software calculated**
96	**Volume/Service Flow Ratio (V/SF)**	**Software calculated**
97	**Future AADT**	**TMPD**
98	**Year of Future AADT**	**TMPD**

2.10.2 Diagram of Current Process



2.10.3 Functions Not Used

All of the HTRIS Functions are currently being used.

2.10.4 Process Improvements

- Incorporate GPS technology for sample data collection.
- Automate the transfer of collected roadway sample data into RNS.
- Use GIS location function for reporting purposes.